भारतीय मानक
Indian Standard

IS 17639 : 2021
Superseding IS 5807 (Part 2) : 1975

नम गर्मी के प्रति सतही फिनिश की प्रतिरोध का आकलन — परीक्षण की विधि

Assessment of Surface Finish Resistance to Wet Heat — Method of Test

ICS 97.140

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भारतीय मानक ब्यूरो
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Furniture Sectional Committee, CED 35

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Furniture Sectional Committee had been approved by the Civil Engineering Division Council.

This standard was originally published in 1970 as IS 5807 (Part 2) : 1975 'Method of test for clear finishes for wooden furniture Part 2 Resistance to marking by wet heat' and subsequently revised in 1975. Initially the standard covered the test method designed to test the clear finishes for wooden furniture on which containers of hot beverages may be placed and on which spillage occurs. In view in the diversification in the use of different materials and finishing systems in the furniture industry, this standard has been brought out and supersedes IS 5807 (Part 2) : 1975 (*first revision*). In this version, the test method has been given for the assessment of the resistance to wet heat of all rigid furniture surfaces regardless of materials. However, it does not apply to leather and textile surfaces.

The test is intended to be carried out on a part of the finished furniture, but can be carried out on test panels of the same material, finished in an identical manner to the finished product and of a size sufficient to meet the requirements of the test. The test is carried out on unused surfaces.

In the formulation of this standard, considerable assistance has been taken from ISO 4211-2 : 2013 'Furniture — Tests for surface finishes — Part 2 Assessment of resistance to wet heat'.

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

ASSESSMENT OF SURFACE FINISH RESISTANCE TO WET HEAT — METHOD OF TEST

1 SCOPE

1.1 This standard covers the test method for the assessment of the surface resistance to wet heat of all rigid furniture surfaces regardless of materials.

1.2 It does not apply to leather and textile surfaces. Also, the test shall be carried out on unused rigid furniture surfaces.

2 REFERENCES

The following Indian standards contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
101 (Part 4/Sec 2) : 2021	Methods of sampling and test for paints, varnishes and related products: Part 4 Optical tests, Section 2 Colour-visual comparison of colour of paints (*fourth revision*)
737 : 2008	Wrought aluminium and aluminium alloy sheet and strip for general engineering purposes — Specification (*fourth revision*)
2480 (Part 1) : 1983	Specification for general purpose glass thermometers: Part 1 Solid — Stem thermometers (*second revision*)
15262 : 2002	Geometrical product specifications (GPS) — surface texture: Profile method — Terms, definitions and surface texture parameters
15263 : 2002	Geometrical product specifications (GPS) — Surface texture: Profile method — Rules and procedures for the assessment of surface texture

3 TERMINOLOGY

For the purposes of this standard, the following terms and definitions shall apply.

3.1 Roughness (R_a) — Arithmetic mean of the absolute values of the profile deviations from the mean line.

3.2 Test Area — Part of the test surface under the heat source (*see* **5.2**).

3.3 Test Panel — Panel including the test surface.

NOTE — It may be cut from a finished item of furniture or it may be a separate panel produced in the same manner as the finished item of furniture.

3.4 Test Surface — Part of the test panel.

4 PRINCIPLE

A standard aluminium alloy block at a specified test temperature is placed on a damp cloth in contact with the test surface. After a specified test period, the block and damp cloth are removed and the test surface is left for 16 h to 24 h. Thereafter, the test surface is cleaned and examined for damages such as discolouration, change in gloss, change in colour, blistering, and swelling. The test result is stated in a numerical rating code.

5 APPARATUS AND MATERIALS

5.1 Thermometer — As specified in IS 2480 (Part 1), capable of insertion to the bottom of the centre bore of the heat source (*see* **5.2**) or other means of measuring the temperature of the heat source to an accuracy of ± 1 °C.

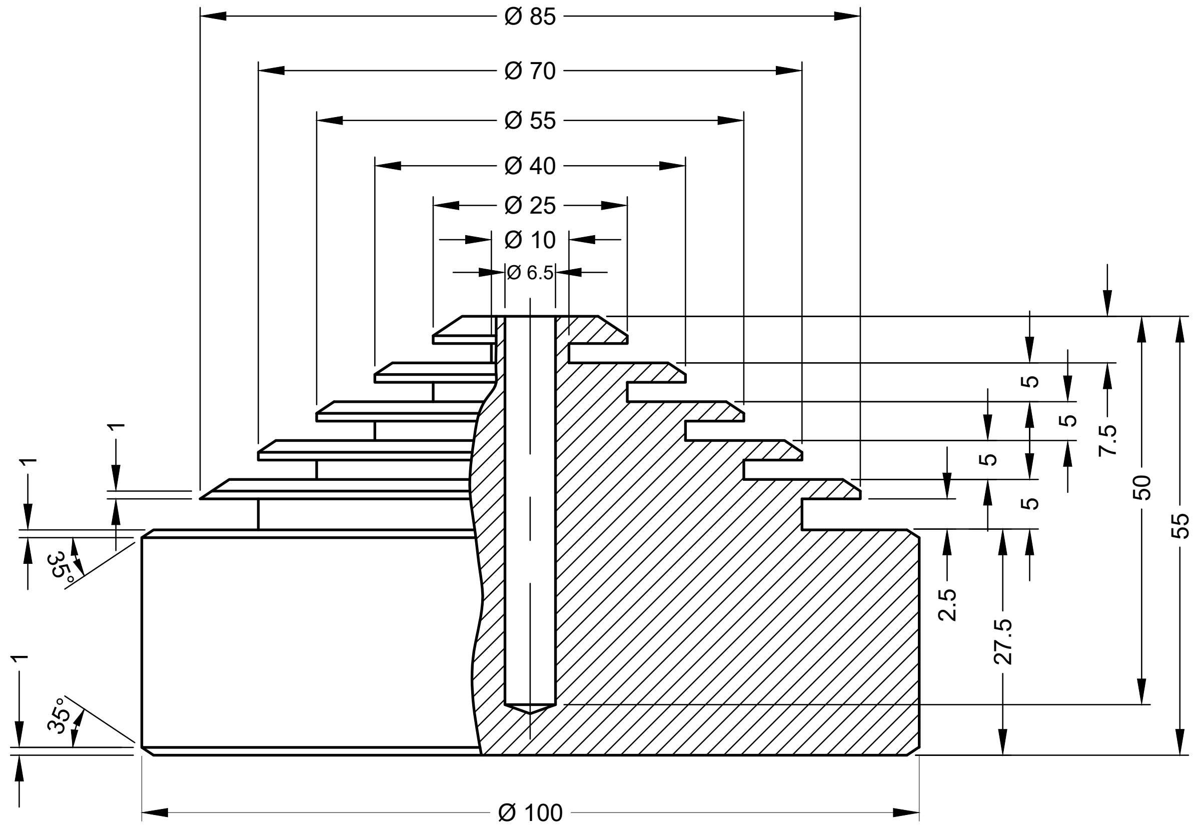
5.2 Heat Source — A block as shown in Fig. 1, manufactured from aluminium alloy (shall contain more than 94 percent aluminium). The roughness of the bottom surface shall be (2 ± 1) µm, expressed as R_a, according to IS 15262 and IS 15263.

NOTE — Alloy 64430 (*see* IS 737) is suitable.

The following tolerances are applicable:

Dimensions:	± 0.2 mm of the nominal length
Angles:	± 2° of the nominal angle

5.3 Oven — Which can heat the heat source to a temperature higher than the test temperature.



All dimensions in millimetres

FIG. 1 ALUMINIUM BLOCK USED AS HEAT SOURCE

5.4 Cleaning Cloth — White soft absorbent cloth.

5.5 White Polyamide Fibre Cloth — A plain weave having approximately 40 threads/cm in both warp and weft direction, weighing approximately 50 g/m^2, and cut (120 ± 3) mm square.

5.6 Deionised or Distilled Water

5.7 Heat-Insulating Foam — A melamine foam, with the following characteristics;

a) Density shall be between 8.5 kg/m^3 and 11.5 kg/m^3;
b) Heat conductivity shall be less than 0.035 W/mK; and
c) The foam shall withstand a temperature higher than 200 °C.

5.8 Diffuse Light Source — Light source providing evenly diffused light, giving an illumination on the test surface of (1 200 ± 400) lx. This may either be diffused daylight or be diffused artificial daylight.

NOTE — The daylight shall be unaffected by surrounding trees, etc. When artificial light is used, it is recommended that it should have a correlated colour temperature of (6 500 ± 50) K and an R_a, greater than 92 in accordance with IS 101 (Part 4/Sec 2).

6 PREPARATION AND CONDITIONING

6.1 Conditioning

Conditioning of the test surface shall begin at least one week before testing and shall be carried out in air at a temperature of (27 ± 2) °C and relative humidity of (65 ± 5) percent.

The conditioning time shall be stated in the test report (*see* **10**).

6.2 Test Surface

The test surface shall be substantially flat and with a size sufficient to meet the requirements of **7**.

7 TEST PROCEDURE

7.1 Testing

Immediately after conditioning, the test shall be carried out in a test atmosphere of (27 ± 2) °C.

The test surface shall be placed horizontally. It shall accommodate the required number of tests, with at least 15 mm spacing between the perimeter of adjacent test surfaces, and between the perimeters of the test surfaces and the edges of the panel. Where tests are carried out simultaneously, the perimeters of the test surfaces shall be separated by a minimum of 50 mm. If there is any reason to suppose that the properties of the test surface may vary, two identical tests shall be carried out simultaneously.

The test surface shall be lightly wiped with a cleaning cloth (*see* **5.4**) before the testing.

Using the oven (*see* **5.3**), raise the temperature of the heat source to a temperature higher than the specified test temperature, and transfer it to the heat insulating foam (*see* **5.7**).

Place the thermometer (*see* **5.1**) or other means of measuring temperature in the centre bore of the heat source (*see* **5.2**). If the temperature is not higher than the specified test temperature, the heat source shall be placed again in the oven until achieving this higher temperature.

Place the white polyamide fibre cloth (*see* **5.5**) centrally on the test surface. Spread (2 ± 0.2) cm^3 of distilled or deionised water (*see* **5.6**) uniformly over the whole area of the white polyamide fibre cloth.

NOTE — A graduated eye dropper is suitable for dispensing the distilled or deionised water.

When the heat source reaches the specified test temperature with an accuracy of ± 1 °C, immediately place it on the centre of the white polyamide fibre cloth.

After 20 min in this position, remove the block. Wipe the test surface dry with the cleaning cloth (*see* **5.4**) when it has cooled. Record the position of each test surface and its temperature. Allow the test surface to stand undisturbed from 16 h to 24 h. Wipe each test surface with the cleaning cloth (*see* **5.4**) and examine the test panel.

7.2 Test Temperatures

The test temperatures shall be stated in requirement specifications, selected from the following:

a) 55 °C,
b) 70 °C,
c) 85 °C and
d) 100 °C.

8 EXAMINATION OF THE TEST PANEL

Carefully examine the test surface using the light source (*see* **5.8**), for damage, for example, discolouration, change in gloss and colour, blistering, swelling, and other defects. For this purpose, illuminate the surface separately and examine from different angles, directions, and planes, including angle combinations such that the light is reflected from the test surface and towards the observer's eye. Viewing distance shall be 0.25 m to 1.0 m. Changes caused by the test shall also be determined by touching the surface.

9 ASSESSMENT OF RESULTS

Rate the test surfaces by comparing the test area with the area surrounding it according to Table 1.

Each test surface shall be rated by an experienced observer.

In cases of doubt, three observers shall be required. All observers shall have good colour vision. In case of three observers, the reported rating for the test surface shall be the average to the nearest nominal value.

Duplicate tests shall be assessed and reported separately.

Table 1 Descriptive Numerical Rating Code

(*Clause* 9)

Numerical Rating	Description
5	**No change** Test area indistinguishable from adjacent surrounding area
4	**Minor change** Test area distinguishable from adjacent surrounding area, only when the light source is mirrored on the test surface and is reflected towards the observer's eye, for example, discolouration, change in gloss and colour. No change in the surface structure, for example, deformation, swelling, fibre raising, cracking, blistering.
3	**Moderate change** Test area distinguishable from adjacent surrounding area, visible in several viewing directions, for example, discolouration, change in gloss and colour. No change in the surface structure, for example, swelling, fibre raising, cracking, blistering.
2	**Significant change** Test area clearly distinguishable from adjacent surrounding area, visible in all viewing directions, for example, discolouration, change in gloss and colour. And/or Structure of the surface slightly changed, for example, swelling, fibre raising, cracking, blistering
1	**Strong change** The structure of the surface being distinctly changed And/or discolouration, change in gloss and colour And/or the surface material being totally or partially removed And/or the polyamide fibre cloth adhering to the surface

10 TEST REPORT

The test report shall include at least the following information:

a) A reference to this Indian standard;
b) A description of the test panel (relevant data);
c) The test temperature or temperatures;
d) The conditioning time;
e) The assessment of each test surface in accordance with **9**;
f) If applicable, additional information regarding type of damage;
g) Any deviations from this Indian standard;
h) The name and address of the test facility; and
j) The date of the test.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Furniture Sectional Committee, CED 35

Organization	*Representative(s)*
In Personal Capacity (*II A, K-11, Ground Floor, Kailash Colony, New Delhi 110048*)	Shri Balbir Verma (***Chairman***)
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Central Public Works Department, New Delhi	Shri A. K. Sharma Shrimati Nandni Mukopadhyay (*Alternate*)
Centre for Environmental Planning and Technology (CEPT) University, Ahmedabad	Prof Shrutie Tamboli Prof Snehal Nagarsheth (*Alternate*)
CSIR-Central Building Research Institute, Roorkee	Shri S. K. Negi Shri Ashok Kumar (*Alternate*)
Directorate of Education Govt of NCT of Delhi, Delhi	Representative
Forest Research Institute, Dehradun	Dr Sadhna Tripathi Dr Kishan Kumar V. S. (*Alternate*)
Godrej & Boyce Mfg Co Ltd, Mumbai	Shri Ega Venkateshwarlu Shri Nirav Shah (*Alternate* I) Shri Lalitesh Mandrekar (*Alternate* II)
Government e-Marketplace, New Delhi	Representative
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The Indian Institute of Architects, Mumbai	Ar Vikramray Pramodray Pandya

Organization	*Representative(s)*
The Supreme Industries Limited, New Delhi	Shri Sanjeev Jain Shri Mukesh Kaul (*Alternate* I) Shri Sanjay Dogra (*Alternate* II)
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BIS Directorate General	Shri Sanjay Pant, Scientist 'F' and Head (Civil Engineering) [Representing Director General (*Ex-officio*)]

Member Secretary

Shri Pradeep Singh Shekhawat
Scientist 'D' (Civil Engineering), BIS

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